

60. The process according to claim 59, wherein the resulting  $^8\text{Be}$  isotope is co-located with a  $^4\text{He}$  atom within the Bose-Einstein condensate and further wherein the interaction between the beam and the co-located  $^8\text{Be}$  isotope and the  $^4\text{He}$  atom results in at least a  $^{12}\text{C}$  atom.

61. The process according to claim 59, wherein the beam is focusing on the Bose-Einstein condensate from at least two opposite directions.

62. A process for tunneling through a potential energy barrier between at least two atoms comprising:

providing a Bose-Einstein condensate comprised of at least two atoms having overlapping wave functions; and

compressing the atoms having overlapping wave functions to facilitate tunneling through the potential energy barrier existing between the at least two atoms within the Bose-Einstein condensate, wherein the tunneling through the potential energy barrier results in the formation of at least a first isotope within the Bose-Einstein condensate.

63. The process according to claim 62, wherein the at least two atoms are  $^4\text{He}$  atoms.

64. The process according to claim 62, wherein the first isotope is  $^8\text{Be}$ .

65. The process according to claim 62, wherein the first isotope has a lifetime on the order of  $1 \times 10^{-15}$  seconds and during the lifetime has an overlapping wave function with a  $^4\text{He}$  atom within the Bose-Einstein condensate.

66. The process according to claim 65, further comprising:

compressing the first isotope and the  $^4\text{He}$  atom with the overlapping wave functions in order to form at least a second atom.

67. The process according to claim 66, wherein the second atom is  $^{12}\text{C}$ .